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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/764,072	01/19/2001	Hisham S. Abdel-Ghaffar	2925-0502P	6788

30594 7590 10/04/2005

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ART UNIT	**PAPER NUMBER**
2115	

DATE MAILED: 10/04/2005

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/764,072
Filing Date: January 19, 2001
Appellant(s): ABDEL-GHAFFAR, HISHAM S.

Gary D. Yacura
<u>For Appellant</u>

EXAMINER'S ANSWER

This is in response to the appeal brief filed 14 July 2005 appealing from the Office action mailed 15 December 2004.

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1. **Real Party in Interest**

Appellant has identified the real party of interest as Lucent Technologies.

2. **Related Appeals and Interferences**

Appellant has not identified a related case that is under appeal. Therefore, it is presumed that there are no related cases that are under appeal.

3. **Status of Claims**

The statement of the status of the claims contained in the brief is correct.

4. **Status of Amendments**

Appellant has not identified the status of any amendments after final rejection because no amendments have been made after final rejection.

5. **Summary of Claimed Subject Matter**

The summary of claimed subject matter in the brief is correct.

6. **Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement for grounds of rejection in the brief is correct. The examiner has withdrawn the rejection of claim 11 under 35 U.S.C. § 102(b). Therefore, this rejection need not be considered. The remaining grounds of rejection are correct.

7. **Arguements**

The statement of the grouping of the claims contained in the brief is correct.

8. **Claims Appealed**

The copy of the appealed claims in the Appendix to the brief is correct.

9. **References of Record**

Premerlani, U.S. Patent 5,958,060

Thornberg U.S. Patent 5,757,772

10. **Grounds of Rejection**

The claim limitations correspond to features in the prior art as follows:

Claim 1	Premerlani
A method of determining a time offset estimate between a central node and a secondary node, comprising:	[Abstract]
receiving, at a central node, downlink and uplink timing information from a secondary node, the downlink and uplink timing information based on a periodic timing scale, the downlink timing information representing timing information for communication from the central node to the secondary node and the uplink information representing timing information for communication from the secondary node to the central node	[col. 5 lines 51-62 and col. 6 lines 13-24]. Terminals 1 and 2 are interpreted as central and secondary nodes respectfully. The delay between the central node and secondary node is interpreted as downlink information and the delay between the secondary node and central node is interpreted as downlink information.
converting the received downlink and uplink timing information to a continuous time scale	[col. 6 lines 20-24]. Determining both the delay between terminal 1 and terminal 2 ($T_{i-2} - T_{i-3}$) and the delay between terminal 2 and terminal 1 ($T_{i-1} - T_i$) are interpreted as converting the received downlink and uplink

	timing information to a continuous time scale.
determining a time offset estimate between the central node and the secondary node based on the converted downlink and uplink timing information	Premerlani explicitly teaches that the "round trip delay can be calculated by subtracting the *delay between terminal 1 and terminal 2…* from the *delay between terminal 2 and terminal 1*" [col. 6 lines 13-24 *emphesis added*]. Round trip delay is interpreted as a time offset between the central and secondary nodes.

Claim 2	Premerlani
The method of claim 1, wherein the downlink information includes a first time measured at the central node of sending a downlink frame to the secondary node and a second time measured at the secondary node of receiving the downlink frame, and the uplink information includes a third time measured at the secondary node of sending an uplink frame.	Premerlani teaches using transmit and receive timestamps in order to calculate uplink and downlink information in order to determine the time offset between the two nodes [col. 5 lines 51-62 and col. 6 lines 13-24]. In particular, the Premerlani system begins with the central node recording a transmit timestamp T_{i-3} and sends it to the secondary node. Upon reception, the secondary node records a receive timestamp T_{i-2}. Next, the secondary node records a new transmit timestamp as T_{i-1} and sends all

	timestamps back to the central node.

Claim 3	Premerlani
The method of claim 2, further comprising: measuring, at the central node, a fourth time of receiving the uplink frame, and wherein the converting step converts the first, second, third and fourth times to a continuous time scale.	[col. 5 lines 51-62 and col. 6 lines 13-24]. Once the central node receives timestamps T_{i-3}, T_{i-2} and T_{i-1}, the central node records a new receive timestamp as T_{i-3} and calculates the uplink and downlink information, converting to compensate for any wrap around or roll over if necessary, in order to determine the time offset between the central and secondary node.

Claim 4	Premerlani
The method of claim 3, wherein the determining step comprises: determining uplink and downlink delay indicators based on the converted first, second, third and fourth times, and calculating the time offset estimate based on the uplink and downlink delay indicators	[col. 6 lines 13-24]. Premerlani uses the uplink and downlink delays, interpreted as converted first, second, third and fourth times, are used to calculate a round trip delay which is interpreted as a time offset.

Claim 5	Premerlani in view of Thornberg

The method of claim 4, wherein the determining uplink and downlink delay indicators step is performed for a plurality of first, second, third and fourth time sets; and the calculating step calculates the time offset estimate based on the plurality of uplink and downlink delay indicators.	Premerlani does not explicitly teach calculating a plurality of uplink and downlink times. Thornberg teaches calculating a plurality of uplink and downlink delays in order to find an average uplink and downlink delay [col. 20 lines 15-22]. It would have been obvious to one of ordinary skill in the art to realize the benefit measuring a plurality of uplink and downlink delays because as it is well known, delay times can vary between transmissions and by measuring multiple delays, a more accurate estimate of uplink and downlink delays can be obtained.

Claim 6	Premerlani in view of Thornberg

The method of claim 5, wherein the calculating step comprises: determining a minimum uplink delay indicator and a minimum downlink delay indicator from the plurality of uplink and downlink delay indicators; and calculating the time offset estimate based on the minimum downlink delay indicator and the minimum uplink delay indicator.	Premerlani teaches determining a minimum round trip delay, which would obviously derive from a minimum uplink and downlink delay [col. 5 lines 28-32].

Claim 7	Premerlani
The method of claim 1, further comprising: sending a downlink frame to the secondary node, the downlink frame including a first time measured at the central node indicating when the downlink frame is sent; and wherein the receiving step receives an uplink frame at the central node, the uplink frame includes the first time, a second time measured at the secondary node of receiving the downlink frame, a third time measured at the secondary node of sending the uplink frame.	Premerlani teaches using transmit and receive timestamps in order to calculate uplink and downlink information in order to determine the time offset between the two nodes [col. 5 lines 51-62 and col. 6 lines 13-24]. In particular, the Premerlani system begins with the central node recording a transmit timestamp T_{i-3} and sends it to the secondary node. Upon reception, the secondary node records a receive timestamp T_{i-2}. Next, the secondary node records a new transmit timestamp as T_{i-1} and sends all three

	timestamps back to the central node.

Claim 8	Premerlani in view of Thornberg
The method of claim 1, further comprising: setting a timer at a start of the method; and stopping the method if the timer times out.	Thornberg teaches setting a timeout period to determine if data has been lost in transmission [col. 6 lines 2-5]

Claim 9	Premerlani in view of Thornberg
The method of claim 1, further comprising: compensating the time offset estimate for DC bias errors.	Because the Premerlani-Thornberg system compensates for time offset, it is interpreted that the Premerlani-Thornberg teachings can be utilized to compensate for any time offset including those caused by DC biased errors.

Claim 10	Premerlani in view of Thornberg
The method of claim 1, wherein the central node is a radio network controller.	Thornberg teaches a cellular communications system in which a mobile device communicated with a radio network controller [col. 3 line 64 – col. 4 line 1, col. 3 lines 7-16 and 42-45].

11. **Response to Arguements**

Rejections under 35 U.S.C. 102:

Arguments under Claim 1:

A) Premerlani does not disclose converting the received downlink and uplink timing information to a continuous time scale.

The examiner disagrees with appellant's contention. Although Premerlani does not compensate for time wraparound until after an initial round trip delay is calculated, Premerlani still teaches converting received downlink and uplink timing information to a continuous time scale. In particular, Premerlani records four timestamps T_{i-3}, T_{i-2}, T_{i-1} and T_i with each timestamp representing a counter value. Because the counter can wraparound (i.e. making the counter periodic), it is interpreted that the timestamps derived from the counter exists on a periodic time scale in accordance with the counter from which the timestamps are measured. Next, Premerlani teaches calculating a delay between terminals 1 and 2 and a delay between terminals 2 and 1 or in other words, a downlink and uplink delay time. Calculating the downlink and uplink delay values comprise finding a difference between the timestamp values (i.e. downlink time = $T_{i-3} - T_{i-2}$ and uplink time = $T_{i-1} - T_i$). This process converts the periodic timing information (i.e. distinct points in time represented by the timestamps) into values that represent a delay time or time duration. The examiner notes that claim 1 does not define that the downlink and uplink timing information must wraparound in order to convert the downlink and uplink timing information into a continuous time scale as is recited in allowed claim 11. Therefore, calculating a delay between points based on a periodic scale (i.e. the downlink and uplink timing information) can be interpreted as "converting the received downlink and uplink

timing information to a continuous scale" because the delay values which represent the delay between the both the downlink and uplink timing information represent a continuous time within the periodic time scale and therefore can be interpreted as existing in a continuous time scale.

For example, assume the counter in Premerlani can count to 10 before wraparound[1]. Measuring the four timestamps T_{i-3}, T_{i-2}, T_{i-1} and T_i it can be seen in Fig. 1 that each timestamp represents a value within periodic time period.

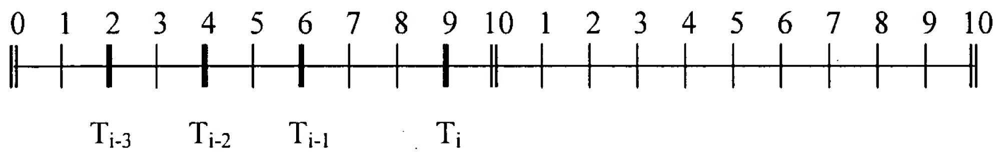

Fig. 1

Next, when calculating both the downlink and uplink times, (i.e. converted downlink and uplink timing information) the delay between the timestamps represented by Δd for the converted downlink timing information and Δu for the converted uplink timing information represents a continuous time period as can be seen in Fig. 2.

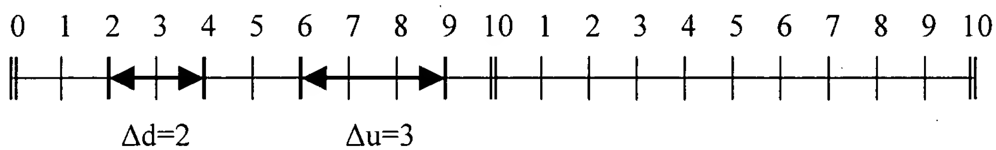

Fig. 2

Finally, both Δd and Δu are used to calculate a round trip delay herein interpreted as a time offset.

B) Premerlani does not disclose determining a time offset estimate between the central node and the secondary node based on the converted downlink and uplink timing information.

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[1] a count value of 10 is assumed merely for simplicity.

The examiner disagrees with appellant's contention. The round trip delay (RTD), interpreted as a time offset, is calculated using the converted downlink and uplink timing information set forth in section A. In particular, Premerlani explicitly teaches that the RTD "can be calculated by subtracting the delay between terminal 1 and terminal 2… from the delay between terminal 2 and terminal 1."

C) Claims 5-6 and 8-10 depend from independent claim 1 and are likewise allowable over Premerlani in view of Thornberg because Thornberg discloses nothing related to converting the periodic delay into a continuous time scale.

The examiner disagrees with appellant's contention. Claim 1 was rejected under 35 U.S.C. §102(b) over Premerlani and the rejection for claim 1 is proper for the reasons as given above in sections A and B.

The examiner believes that the applied references teach the claimed invention to the extent claimed and affirmation of the rejections is respectfully requested.

Mark Connolly
Examiner
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Conferees:

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